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DISEASES OF SPECIAL CROPS

RECENT INFORMATION ON TOBACCO DOWNY MILDEW

Since the last report on tobacco downy mildew (Peronospora hyoscyami), in the Reporter for March 15, pages 16 and 19, the disease has appeared in all the States in which it occurred in 1932, except Maryland and Pennsylvania. It apparently has not caused much commercial damage this year. Some of the factors, mentioned in the following reports, which might have contributed to this decrease in loss included unfavorable weather conditions hindering the spread of mildew so that in many instances growers were able to get their plants set in the field before the disease attacked them, early planting of fields leading to the same results, and seeding of a larger number of beds so that some escaped infection.

A comparison of the dates when downy mildew was first found in 1932 and 1933 is given in the following lists:

	1932	1933
Florida:	About February 23	Probably about the same as Georgia.
Georgia:	December 30, 1931, and January 21, 1932.	February 20.
South Carolina:	Found March 30, apparently had been present at least three weeks.	March 21.
North Carolina:	February 23.	Reported March 30, but noticed probably about March 21.
Virginia:	Reported June 8, but spray demonstrations had been carried on for four weeks.	April 24.
Maryland:	May 31.	No report yet.
Pennsylvania:	June 15.	No report yet.

Reports from the various States follow:

FLORIDA: So far this season we have had but a trace of downy mildew in the entire Florida shade tobacco wrapper section. It has been reported from two or three seed beds, but nowhere has it caused serious injury. All of the tobacco has been set and we are anticipating very little trouble in the field. Our own plants at the Station are too large for setting and the bed should have been destroyed early this week. However, last Monday downy mildew put in its appearance and we are letting the seed bed remain until we see what sort of a course the disease will run under existing conditions. (L. O. Gratz - Apr. 28).

GEORGIA: During the period February 20 to April 15, the 1933 outbreak of tobacco downy mildew enveloped plant beds throughout the southern Georgia tobacco district. The disease did not become widespread over this area before the last week in March. It spread less rapidly and was much less severe than in 1932.

In Georgia mildew became most prevalent just at the peak of the transplanting season and, on many farms, caused a delay of two weeks in setting. However, the damage from loss of plants generally was not serious. While loss of plants in a limited few beds (affected early or when the seedlings were very small) reached as high as 95 per cent, in the great majority not more than 5 per cent of plants were killed. As in previous years affected plants that were not killed outright soon recovered and apparently grew normally.

Cool moist weather prevailed during the first three weeks of April, and during this period outbreaks of mildew were observed in early tobacco fields in Carlton, Pierce, Berrien, Lowndes, Cook, and Tift Counties, Georgia. Although many of the leaves were severely spotted the actual damage was not considered serious at the time, because comparatively few marketable leaves had yet developed. (J. G. Gaines - Apr. 29).

SOUTH CAROLINA: From reports from various sources, mostly through the county agents, I doubt if there are many tobacco beds in South Carolina that have escaped mildew infection. The actual damage done to plants this year was not as great as 1932, yet with different weather conditions it probably would have been very serious. After each shower of rain or heavy fog the mildew seemed to start up anew on areas that had been apparently free prior to that time. If any plants have been infected the second time we were not able to detect it. In fact, both Dr. Armstrong and myself have been unable to re-infect plants that either have recovered or were showing decided signs of recovery. Maybe these infected areas of recovered plants will break down later, but up to now they are still healthy, so far as outward mildew symptoms are concerned. From the information at hand it seems that most tobacco growers in this section have already set most of their crop. Some farmers did not have enough plants to set what they had planned, but on the whole I would say that at least 70 to 80 per cent of a normal crop has been set to the field in this State. Most farmers have learned not to transplant while the mildew is active in the beds. They either set before plants were infected or waited until there were signs of recovery. (W. M. Lunn - Apr. 29).

I have talked to a few county agents and have just called Mr. Lazar, the District Agent, and all of us seem to be agreed that the damage from the downy mildew this season has been much less than it was last year. As far as we can learn, it is now apparently in every bed in the whole area, though many growers got their plants into the field before the disease appeared. As soon as the growers heard of an infected bed in the vicinity they rushed to put out their plants and in this way apparently the majority of them escaped damage. Nearly every one also planted a large excess of bed area and not all the beds were attacked at the same time. There is no shortage of plants, as was the case last year, and no complaint of bad stands in the field. From the experience this season, I am wondering if an early seeding of the beds and an earlier planting in the field may not be an important method to escape the ravages of the disease during most seasons.

Our experience at the Experiment Station this year has been that unless the plants are attacked when they are fairly small they will not be killed and they soon recover from the disease and grow vigorously. Even the plants under cover and watered profusely have recovered, as well as those with the covers removed from the beds.

An important factor in the lack of serious damage comparable to last year may also be the dry weather in March and April. We have had very little rain. (G. M. Armstrong - Apr. 28).

NORTH CAROLINA: So far I know of only one tobacco bed affected with downy mildew, on the farm of Fred Yates, Chadbourn. I visited this bed on March 30, and the tenant told me that they noticed the disease about ten days before that date; he could not tell me exactly when, but said that they saw it the morning after the last hard rain, and from our records at the station it appears that this was on March 21. This date can then be put down as the date of appearance of the disease in this section. The disease had not made much headway in the ten days, although it was scattered over a considerable portion of the bed; the plants were damaged badly in the portion of the bed where they had first seen it.

The growers throughout this section have planted about twice the plant bed area they have put out in past years for the acreage intended; they figure that if downy mildew takes half the plants, they still will have sufficient to plant their intended acreage. (G. A. Meckstroth - Apr. 4).

Last week was rainy and cold, apparently ideal for mildew. On Saturday, I drove to Wilson via Wake Forest, Franklinton, Louisburg, Castalia, Rocky Mount, and inquired frequently about the disease. None was found till we got to area near Castalia. Then it was present in old bed sites where it had appeared first about April 8 or 10. On Sunday, I scouted Wilson area. One rarely found beds free from mildew. In most of these the disease was just appearing on leaf or two of a few plants. Toward Bailey (on road toward Raleigh) there were scattered infections which had come first about April 14. Near Zebulon we found a few which had just been noticed first on April 22 and 23. Occasional beds between Zebulon and Wake

Forest had infections which were noted first on April 22 or 23. Yesterday, I found near Wilton (between Oxford and Creedmoor) on an old road a single bed in which infection first came to notice April 8. I scouted the neighborhood for a couple of miles in all directions but found no more of the disease. This bed was on site of infected bed in 1932. Today, I went up to a lone infection just across the North Carolina line, north of Townsville in Vance County, Virginia. It had been there since April 8, on an old bed. On my return past Stem, North Carolina, I found that it was there too. The counties included in this survey are Wake, Nash, Granville, and Wilson Counties in North Carolina, and Vance County, Virginia. (F. A. Wolf - Apr. 25).

VIRGINIA: I have just received word that downy mildew of tobacco has been found in Halifax, Virginia. (James Godkin - Apr. 24).

C. L. Hall and J. E. Stone, county agents of Halifax and Pittsylvania Counties, respectively, have reported the wide occurrence of downy mildew in their Counties. (Paul R. Miller - May 2).

V E G E T A B L E D I S E A S E S

FUSARIUM WILT OF PEA IN CALIFORNIA

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California is the twelfth to be added to the growing list of States in which pea wilt, caused by Fusarium orthoceras var. pisi, is known to occur. The States in which the disease has previously been reported are: Maryland, Pennsylvania, Ohio, Michigan, Indiana, Illinois, Wisconsin, Iowa, Idaho, Montana, and Washington. These States constitute a belt across the United States in which peas are grown as a summer crop and where the average soil temperatures during a part of the growing season fall within the optimum range for the disease, namely, 18° to 24° C. Where peas are grown as a winter crop the absence of sufficiently high temperatures may preclude appearance of the disease even when the fungus be present, a condition presumed to occur in certain pea sections of California. That wilt is present, however, is clear from the following experience:

In driving between San Luis Obispo and Pismo on April 12, a few fields of peas were observed to contain spots of yellowing plants. Symptoms of the plants strongly suggested wilt, and a collection of specimens was taken for laboratory culturing, an essential to the final diagnosis of this disease. Practically pure cultures of F. orthoceras pisi were recovered from the lower stem of wilting plants taken from certain of these spots. In other spots, however, the vines were dying from root rot.

About 9,000 acres of peas are grown in the county and the early spring crop is predominantly Laxton's Progress, a wilt-susceptible variety. Although on the coast, the area is far enough south to be subject to

sufficiently high temperatures in early spring to favor the wilt fungus, at least in some years, bringing about the expression of the disease in the latter part of March and April, killing the plants as they come into bloom.

FRUIT DISEASES

DEVELOPMENT OF APPLE SCAB (VENTURIA INAEQUALIS)

NEW YORK: Trap slides placed in the unsprayed McIntosh orchard at Ithaca the morning of April 17 showed a light shoot of ascospores, averaging .8 ascospores in the space covered by a half-inch circular cover glass. Slides exposed to the heavy shower the morning of April 18, showed 197 ascospores in the same amount of space.

Samples gathered in a McIntosh block right on Lake Ontario in Orleans County, April 12, showed 17 per cent of the perithecia with less than half the ascospores colored while 65 per cent of the perithecia had over half their ascospores colored. Another sample from a McIntosh orchard in an earlier location 9 miles from the Lake in Orleans County but where scab was less severe last season showed on April 12, only 6 per cent with less than half the spores colored and 9 per cent with over half the spores colored.

Samples from the Lake Ontario block taken April 18, showed that slight discharge of ascospores had occurred.

Samples from a McIntosh orchard near the Lake in Wayne County gathered April 14, showed 14 per cent of the perithecia with less than half the spores colored, 48 per cent with over half the ascospores colored and 1 per cent in which some spores had already been discharged.

Samples from a McIntosh orchard taken at Spencerport, Monroe County, April 20, showed a considerable discharge of ascospores had taken place. Whether infection occurred during the rain period of April 15 to 18, depends largely on what date the ascospore discharge commenced in that area. (W. D. Mills, Apr. 24).

Hudson Valley: Perithecia from 4 McIntosh samples averaged 7 per cent of the perithecia with asci cut out but no colored spores, 21 per cent with up to 10 per cent of the asci containing colored spores, 31.5 per cent with asci containing between 10 and 50 per cent colored spores, and 40.5 per cent of the asci containing more than 50 per cent colored spores. The samples gave a heavy discharge when tested for shooting. Orchards in which scab was a problem last year, are in considerable danger with the next scab rain. (J. M. Martin, Apr. 20).

Dutchess County: Apple scab development way ahead of schedule. (J. A. Evans).

PENNSYLVANIA: Apple scab spores are developing much ahead of the buds on the trees. We have had rather high air temperatures and plenty of rain, which have been favorable for spore development, while the soil temperatures have been relatively low, resulting in the retardation of bud development. In some of our southern and central counties, we have had some shooting going on for the past few days. This is the first spore discharge that we know of since spray information was instituted in this State. The delayed dormant will be a very important scab control spray for Pennsylvania. (George L. Zundel, Apr. 10).

VIRGINIA: Apple scab - First spore discharge at Blacksburg, April 4, at Charlottesville and Winchester, April 11. (S. A. Wingard, May 2).

MICHIGAN: With a mild winter and sufficient moisture, apple scab perithecia are abundant. Colored ascospores were found at East Lansing on March 30. Rains and mild weather are pushing the development of ascospores and discharge before the silver tip stage is expected. The stage of maturity of ascospores is generally the same throughout the apple producing counties of Michigan. (Donald Cation, Apr. 10).

RUSTS ON CEDAR

NEW YORK: (From Weekly News Letter, April 24). Cedar apples, and there is a tremendous crop around Warwick, are pushing out horns. (Ray Bender - Orange County).

Dutchess County: Fruiting cankers of the quince rust, Gymnosporangium germinale, observed April 15, and telial horns of the apple rust, G. juniperi-virginianae, and hawthorn rust, G. globosum, are now one-quarter inch in length. (J. A. Evans).

Ulster County: The rains of the forepart of the week caused the gelatinous horns of G. juniperi-virginianae to protrude nearly one-half inch; also the cankers of G. germinale became quite gelatinous during the same period. (W. J. Clark).

DISEASES CAUSED BY NEMATODES

OBSERVATIONS ON NEMATODE DISEASES OF PLANTS

G. Steiner and Edna M. Buhrer

The bulb or stem nematode, Tylenchus dipsaci, was observed in carrots from Sweden, a new country for this host. The carrots were intercepted by the Bureau of Plant Quarantine inspectors in Baltimore. The same nematode was observed for the first time in narcissus bulbs from New Hampshire, collected by O. Butler of the University of New Hampshire.

Three new hosts are to be mentioned for the root-knot nematode, Caconema radicicola: (1) Thalictrum tsukushinense originating from Japan, (2) Sparmannia africana originating from Germany. Both of these hosts were intercepted by D. P. Limber of the Bureau of Plant Quarantine at the Inspection House in Washington, D. C. (3) Iris tingitana hybrid var. Wedgewood from North Carolina. In the last-named host the root-knot nematode was associated with Tylenchus dipsaci.

MISCELLANEOUS NOTES

ROOT ROT OF ALFALFA IN VIRGINIA: Root rot (Sclerotinia trifoliorum) has been very prevalent and destructive on alfalfa and all clovers this year. The first reports came in during January and are still coming in. The unusually wet winter and spring may be responsible. (S. A. Wingard, May 2).

DISEASES AND INJURIES OF ORNAMENTALS IN VIRGINIA: Boxwood and other ornamentals have suffered considerably from winter injury, probably due to their weakened condition caused by drouths of 1931 and 1932. (S. A. Wingard, May 2).

Botrytis sp. on tulip has been unusually destructive this spring. (S. A. Wingard, May 2).

METHODS OF PRESENTING WEATHER DATA

E. P. Meinecke, Division of Forest Pathology

(NOTE: Many collaborators will be interested in the comments on methods of presenting weather data in Supplement 84, "Diseases of Plants in the United States in 1931", sent by E. P. Meinecke.

Dr. Meinecke's criticisms are all valid, and a number of others come readily to mind. In the very limited space now available for our reports it is of course impossible to present anything like a detailed summary of weather conditions. Moreover, in view of the wide distribution of detailed meteorological information by the United States Weather Bureau this might well seem unnecessary.

The purpose of the maps was to place in convenient proximity to our summary of Diseases of Plants in 1931 an indication of the deviation from normal of the weather in various parts of the United States during the year. Deviation from normal should furnish at least one means of correlating the weather of the year with unusual crop or disease conditions since obviously "normal" indicates an average of the conditions to which the crops of the region have been subject during a series of years.

Any one attempting to use these general deviation maps without a good working knowledge of local climatology of continued reference to the normal figures will readily be led into error. Dr. Meinecke's warning against such misuse is timely. N. E. S.)

In "Diseases of plants in the United States in 1931", Plant Disease Reporter, Supplement 84, March 15, 1933, a number of temperature and precipitation maps are given which show how difficult it is to present certain significant data graphically without giving at the same time information regarding modifying factors.

Figs. 1 to 4 show the percentage of normal temperature for the winter. On page 6 it is stated that the stations were selected as being fairly representative of the various sections of the country. Presumably the stations were chosen as representative of the agriculturally important sections. Obviously the object of the maps is to show temperatures and precipitation as a background for the understanding of physiological effects, on host or parasite. It seems doubtful whether the percentage system of presentation gives a true picture, easily understood.

Fig. 1 shows 236 per cent for North Dakota for the winter months. The normal lies so far below the limit for physiological activity that even 236 per cent is still negative as far as vegetation goes. On the other hand, only 4 per cent below the normal stamps the winter as a cold one for Florida. That this consideration was not present in the minds of the authors is shown by the legend in which 96 to 104 per cent is given as what may be called circumnormal. Variations within this class may be highly significant in mild climates and without any significance in cold regions.

The inadequacy of the presentation becomes far more pronounced in the precipitation maps. According to Fig. 5, California had, in winter, 51 per cent. In a region with notoriously low annual precipitation but considerable winter activity this indicates a serious deficit. In cold States like Idaho and Nebraska with only 3 per cent more, the percentage figure has an entirely different meaning. But in either case the precipitation of the preceding and following months must be taken into account.

The greatest incongruity appears in Fig. 7. California is credited with 210 per cent for the summer months. The normal June-July-August precipitation in the agricultural regions of California is measured in traces or fractions of an inch, so that 210 per cent of normal, while appearing immense to anyone not familiar with climatic conditions in California, dwindles to nothing when viewed as a physiological influence. The analysis of the maps for other regions will disclose similar discrepancies.